

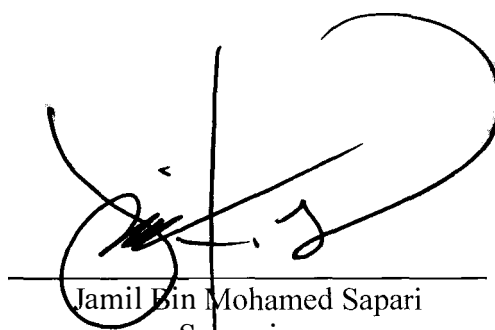
**SYNTHESIS AND CHARACTERIZATION OF PALM BASED  
POLYURETHANE COMPOSITE WITH RIVER SAND AS A  
FILLER**

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**Final Year Project Report Submitted in  
Partial Fulfilment of the Requirements for the  
Degree of Bachelor of Science (Hons.) Chemistry  
in the Faculty of Applied Sciences  
Universiti Teknologi MARA**

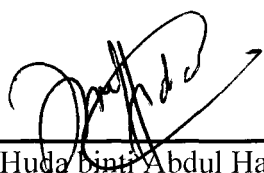
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## **ABSTRACT**

### **SYNTHESIS OF PALM BASED POLYOL FOR RIGID POLYURETHANE COMPOSITE WITH RIVER SAND FILLER**

The use of river sand as a filler in synthesizing polyurethane (PU) have potential benefit to synthesize PU composite. This study carried out to determine the potential of river sand and palm oil in preparation of rigid PU composite. The river sand was first sieve to reach the micro size. Then the palm oil used, which is palm kernel oil was then mixed with polyhydric compound to synthesize polyol via transesterification reaction. The PKO-based polyol was then mixed with other chemicals at different ratio to form PU control rigid foam. Then different composition of river sand was used, which is 5%, 10%, and 15% was used to synthesize PU rigid foam with different composition. The formation of urethane linkage (NHCOO) backbone in PU foam was confirmed using FTIR at wavenumber  $3313\text{ cm}^{-1}$ . The morphological structure of the surface was analyzed using scanning electron microscope at 20 x, 50 x, 150 x and 500 x magnification . The compression test of polyurethane with 15% filler have average compressive load of 8.344 kPa which is higher than other composition which is 6.662 kPa for 5% filler and 7.6630 kPa for 10% filler. This study shows that adding filler to PU increases its structure and strength of the composite. TGA analysis at  $T_{10}$  values for PU control and PU river sand were almost identical. However, the  $T_{50}$  values of the hybrids increased to  $457.34\text{ }^{\circ}\text{C}$